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MS APPEAL BRIEF - PATENTS
PATENT
2658-0275P

IN THE U.S. PATENT AND TRADEMARK OFFICE

In re application of	Before the Board of Appeals
Hye Young KIM et al.	Appeal No.:
Appl. No.: 10/029,144	Group: 2871
Filed: December 28, 2001	Examiner: Z. QI
Conf.: 5231	
For:	METHOD OF FABRICATING PIXEL ELECTRODE IN LIQUID CRYSTAL DISPLAY

APPEAL BRIEF TRANSMITTAL FORM

MS APPEAL BRIEF - PATENTS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

June 3, 2004

Sir:

Transmitted herewith is an Appeal Brief (in triplicate) on behalf of the Appellants in connection with the above-identified application.

- ☐ The enclosed document is being transmitted via the Certificate of Mailing provisions of 37 C.F.R. § 1.8.

A Notice of Appeal was filed on April 5, 2004.

- ☐ Applicant claims small entity status in accordance with 37 C.F.R. § 1.27

The fee has been calculated as shown below:

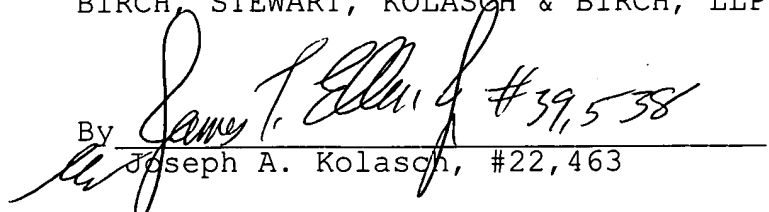
- ☐ Extension of time fee pursuant to 37 C.F.R. §§ 1.17 and 1.136(a) - \$0.00.
- ☒ Fee for filing an Appeal Brief - \$330.00 (large entity).
- ☒ Check(s) in the amount of \$330.00 is(are) attached.
- ☐ Please charge Deposit Account No. 02-2448 in the amount of \$0.00. A triplicate copy of this sheet is attached.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment(s)

(Rev. 02/08/2004)



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BRIEF ON APPEAL ON BEHALF OF APPELLANTS FILED UNDER
PROVISIONS OF 37 C.F.R. § 1.192

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MS APPEAL BRIEF- PATENTS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

June 3, 2004

Dear Sir:

This is an Appeal from the Final Rejection of November 3, 2003 of claims
1-3 and 5-21 in the above-identified application.

I. REAL PARTY IN INTEREST

As evidenced by the Assignment filed December 28, 2001 and recorded at Reel 012422, Frames 0777-0779 the Real Party In Interest in connection with the present application is the Assignee of record, LG. PHILIPS LCD CO. LTD.

II. RELATED APPEALS AND INTERFERENCES

There are no pending Appeals or Interferences related to the present application known to the Appellants or the Appellants' Legal Representatives.

III. STATUS OF CLAIMS

Claims 1-3 and 5-21 are pending in the application. Claims 1-3 and 5-21 stand rejected.

IV. STATUS OF AMENDMENTS

An Amendment Under 37 C.F.R. § 1.111 was filed on August 20, 2003. A Reply Under 37 C.F.R. § 1.116 was filed on February 3, 2004, which requested reconsideration and presented no claim amendments. The Advisory Action of March 5, 2004 considered the request for reconsideration but did not place the application into allowance.

V. SUMMARY OF INVENTION

The present invention pertains to a pixel electrode and a method of fabricating a pixel electrode in a liquid crystal display. The display includes a switching device for driving the pixel electrode (page 4, lines 25-27). The inventive method includes depositing a protective film over a substrate to cover the switching device (page 4, lines 28-29), defining a contact hole in the protective film to expose one electrode of the switching device (page 4, lines 29-31), and forming the pixel electrode connected, via the contact hole, to the one exposed electrode (page 4, line 31 to page 5, line 1). The pixel electrode is formed by placing the substrate in a vacuum chamber and injecting hydrogen-containing gas at a temperature of less than about 400 °C (page 5, lines 1-4), wherein the substrate has a temperature of less than about 200 °C when forming the pixel electrode (page 5, lines 13-14).

VI. ISSUES

The first issue presented for review is whether the Appellants' disclosure in view of Tran (U.S. Patent 5,135,581) and Suzuki (U.S. Patent 6,466,293) suggests all of the elements set forth in claims 1, 5-13 and 15-19 to properly support a rejection under 35 U.S.C. § 103.

The second issue presented for review is whether the Appellants' disclosure in view of Tran (U.S. Patent 5,135,581), Suzuki (U.S. Patent 6,466,293) and

Kaneko (U.S. Patent 6,433,842) suggests all of the elements set forth in claims 2, 3, 14, 20 and 21 to properly support a rejection under 35 U.S.C. § 103.

These two issues are divided into Groups I-XI, which are separately argued below.

VII. GROUPING OF CLAIMS

The Appellants submit that claims 1-3 and 5-21 do not stand or fall together. Instead, the Appellants respectfully wish to group claims 1-3 and 5-21 as follows:

- Group I: claim 1;
- Group II: claim 13;
- Group III: claims 5 and 20;
- Group IV: claims 19 and 21;
- Group V: claims 2, 3 and 14;
- Group VI: claim 6;
- Group VII: claims 7, 8 and 9;
- Group VIII: claims 10, 11 and 12;
- Group IX: claim 15;
- Group X: claim 16; and
- Group XI: claims 17 and 18.

VIII. ARGUMENT

A. Group I, Independent Claim 1

The improper combination of the Appellants' disclosure, Tran and Suzuki fails to suggest all of the elements set forth in claim 1 to properly support a rejection under 35 U.S.C. § 103.

A.1. The Present Invention and its Advantages

The present invention pertains to a novel method for forming a pixel electrode. The present invention uses a hydrogen-containing gas in place of oxygen during sputtering, to thereby make the oxide such as ITO or IZO amorphous. When forming the inventive pixel electrode, the hydrogen-containing gas is injected at a temperature of less than about 400 °C while the substrate has a temperature of less than about 200 °C.

The present invention finds a typical embodiment in claim 1, which sets forth:

1. A method of fabricating a pixel electrode in a liquid crystal display including a switching device for driving the pixel electrode, the method comprising:
 - depositing a protective film over a substrate to cover the switching device;
 - defining a contact hole in the protective film to expose one electrode of the switching device; and
 - forming the pixel electrode connected, via the contact hole, to said one exposed electrode, wherein the pixel electrode is formed by placing the substrate in a vacuum chamber and injecting hydrogen-containing gas at a temperature of less than about 400

°C, wherein the substrate has a temperature of less than about 200 °C when forming the pixel electrode.

A.2 Distinctions of the Invention Over the Appellants' Disclosure and the Secondary References

The Examiner uses the Appellants' disclosure for teachings pertaining to conventional liquid display devices. However, there has been no admission as to prior art in the Appellants' disclosure or in the prosecution history. At page 7, lines 5-6 of the final Office Action of November 3, 2003, the Examiner takes the position: "Any invention must be based on a prior art such as the conventional Figs. 1A-Ad, and that must be a prior art."

However, the Federal Circuit has reaffirmed that the specification cannot be used as prior art absent an admission of prior art by the applicant. See Riverwood International Corp. v. Jones & Co., Inc., 324 F.3d 1346, 66 USPQ2d 1331 (2003). A statement by an applicant during prosecution identifying certain matter not the work of the inventor as "prior art" is an admission that the matter is prior art. In re Nomiya, 509 F.2d 566, 571 n.5, 184 USPQ 607, 611 n.5 (CCPA 1975). In Nomiya, the applicants filed a patent application containing two figures labeled as "Prior Art" and describing as such in the specification.

In this case, there has been no admission or labeling of "Prior Art" in the specification, drawings or prosecution history of the application. The discussion of the conventional art in the specification was provided by the Appellants to better elucidate the problem being solved. "One's own work may not be considered prior art in the absence of a statutory basis, and a patentee should not be 'punished' for referencing his own work . . ." 66 USPQ2d at 1355.

In the final Office Action of November 3, 2003, the Examiner alleges that Tran discloses forming an electrically conductive oxide composition used as a light transmissive electrode in a liquid crystal display at a temperature from about 20 °C to about 300 °C using a stabilizing gas such as H₂ or H₂O. The Examiner also asserts Suzuki teaches forming the LCD in a vacuum chamber.

However, the H₂ or H₂O used as the stabilizing gas in Tran is fundamentally different from the hydrogen-containing gas in the present invention, which is used for a low temperature process in a vacuum chamber.

Tran discusses that when interstitial H ions immersed in the oxide composition by stabilizing gas is present, then oxygen in the ambient air reacts with the H ions rather than the metal ions in the oxide composition. In the absence of the H ions, oxygen in the ambient air reacts with the metal ions in the oxide composition to fill oxygen vacancies in the crystal lattice structure. See Tran at column 3, lines 57-67.

In contrast, the present invention uses a hydrogen-containing gas in place of O₂ gas during sputtering, to thereby make the oxide such as ITO or IZO amorphous.

On the other hand, Tran uses stabilizing gas for increasing oxygen vacancies in the crystal lattice structure of the oxide composition. See Tran at column 3, lines 46-48. As a result, the principle of operation of Tran must be changed for this reference to be utilized. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the reference are not sufficient to render the claims *prima facie* obvious. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

Further, Tran discloses:

When the precursor is a metal, the use of O₂ is required. The O₂ reacts with the metal to form light transmissive, electrically conductive oxides of the present invention. On the other hand, when the precursor is a metal oxide, the use of O₂ is not required. Still, the use of O₂ is preferred even when the precursor is a metal oxide in that metal oxide films have better light transmissive and electrical conductivity characteristics when formed in the presence of O₂. Tran at column 4, line 66 to column 5, line 8.

Tran thus fails to teach or suggest using a hydrogen-containing gas instead of O₂. Tran accordingly teaches away from the invention. It is improper to combine references where the references teach away from their

combination. In re Grasselli, 713 F.2d 731, 218 USPQ 769, 779 (Fed. Cir. 1983)

Suzuki pertains to a process for injecting liquid crystal into a liquid crystal panel formed by joining the upper and lower substrates. Suzuki fails to teach or suggest forming a pixel electrode within a vacuum chamber.

Also, to establish a *prima facie* case of obviousness, it is necessary for the Examiner to present evidence, preferably in the form of some teaching, suggestion, incentive, or inference in the implied prior art, or in the form of generally available knowledge, that one having ordinary skill in the art would have been lead to use the relevant teachings of the implied references in the proposed manner asserted by the Examiner to arrive at the invention. See Ex parte Levengood, 28 USPQ2d 1300 (BPAI 1993). Because the Examiner bears the initial burden of presenting a *prima facie* case of obviousness, if this burden is not met, then the burden of coming forth with evidence or argument does not shift to the Applicant. In re Rijckaert, 9 F.2d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993). Likewise, where an Examiner fails to establish a proper *prima facie* case, the rejection is improper, and should be overturned. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Further, the rigorous burden placed upon the Examiner for establishing *prima facie* obviousness has been emphasized by the United States Court of

Appeals for the Federal Circuit in In re Sang Su Lee, 277 F.3d 1338, 61

USPQ2d 1430 (Fed. Cir. 2002). In Sang Su Lee, the court states:

As applied to the determination of patentability vel non when the issue is obviousness, "it is fundamental that rejections under 35 U.S.C. §103 must be based on evidence comprehended by the language of that section." In re Grasselli, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed. Cir. 1983). The essential factual evidence on the issue of obviousness is set forth in Graham v. John Deere Co., 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966) and extensive ensuing precedent. The patent examination process centers on prior art and the analysis thereof. When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. See, e.g., McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed. Cir. 2001) ("the central question is whether there is reason to combine [the] references," a question of fact drawing on the Graham factors).

"The factual inquiry whether to combine references must be thorough and searching." Id. It must be based on objective evidence of record. This precedent has been reinforced in myriad decisions, and cannot be dispensed with. See, e.g., Brown & Williamson Tobacco Corp. v. Philip Morris Inc., 229 F.3d 1120, 1124-25, 56 USPQ2d 1456, 1459 (Fed. Cir. 2000) ("a showing of a suggestion, teaching, or motivation to combine the prior art references is an 'essential component of an obviousness holding'") (quoting C.R. Bard, Inc., v. M3 Systems, Inc., 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998)); In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) ("Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references."); In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998) (there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant); In re Fine, 837 F.2d 1071, 1075, 5 USPQ2d

1596, 1600 (Fed. Cir. 1988) ("teachings of references can be combined only if there is some suggestion or incentive to do so.") (emphasis in original) (quoting ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984)).

The need for specificity pervades this authority. See, e.g., In re Kotzab, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000) ("particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed"); In re Rouffet, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998) ("even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination. In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious."); In re Fritch, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (the examiner can satisfy the burden of showing obviousness of the combination "only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references"). In re Sang Su Lee, at 277 F.3d at 1342.

A person having ordinary skill in the art would therefore not be motivated to produce the invention as embodied in claim 1 by the improper

combination of the Appellants' disclosure with Tran and Suzuki. Claims dependent upon claims 1 are patentable for at least the above reasons.

Accordingly, a *prima facie* case of obviousness has thus not been made.

A.3 Summary

As has been shown, the Examiner has failed to establish a *prima facie* case of obviousness over the Appellants' disclosure with Tran and Suzuki. Utilization of the Appellants' own disclosure as prior art is improper. Tran teaches away from the invention. The combination of the Appellants' disclosure with Tran and Suzuki fails to teach or suggest all the claimed elements in claim 1. Appellants therefore respectfully submits that the combination of elements as set forth in independent claim 1 of Group I is not obvious by the combination of the Appellants' disclosure with Tran and Suzuki, for the reasons explained above.

Accordingly, reversal of the Examiner's rejection based on the above arguments is respectfully requested.

B. Group II, Claim 13

The combination of the Appellants' disclosure with Tran and Suzuki fails to suggest all of the elements set forth in claim 13 to properly support the rejection of Group II under 35 U.S.C. § 103.

The failures of the combination of the Appellants' disclosure with Tran and Suzuki have been discussed above, and the general discussion thereof is incorporated here, but is not being repeated here so as to avoid repetition. Also, apparatus claim 13 contains all the structural information and conditions of forming the pixel electrode as set forth in method claim 1 (Group I), and all of the distinctions of the invention over Group I are equally applicable to Group II.

Claim 13 pertains to a liquid crystal display a liquid crystal display, which contains:

- a substrate;
- a switching device over the substrate;
- a protective film over a substrate covering the switching device; and
- a contact hole in the protective film, the contact hole exposing one electrode of the switching device, the pixel electrode being connected, via the contact hole, to said one exposed electrode, wherein the pixel electrode is formed by placing the substrate in a vacuum chamber and injecting hydrogen-containing gas at a temperature of less than about 400 °C, wherein the substrate has a temperature of less than about 200 °C when forming the pixel electrode.

As discussed above, the Appellants' disclosure can't be used to allege prior art. Even if combinable, the combination of the Appellants' disclosure with Tran and Suzuki fail to suggest the invention as is embodied in claim 13. As a result, the Appellants' disclosure with Tran and Suzuki are insufficient to allege *prima facie* obviousness over claim 13 of Group II.

Accordingly, reversal of the Examiner's rejection based on the above arguments is respectfully requested.

C. Group III, Claims 5 and 20

The combination of the Appellants' disclosure with Tran and Suzuki fails to suggest all of the elements set forth in claim 5 to properly support the rejection of Group III under 35 U.S.C. § 103. The combination of the Appellants' disclosure with Tran, Suzuki and Kaneko fails to suggest all of the elements set forth in claim 20 to properly support the rejection of Group III under 35 U.S.C. § 103.

The failures of the combination of the Appellants' disclosure with Tran and Suzuki have been discussed above, and the general discussion thereof is incorporated here, but is not being repeated here so as to avoid repetition. Also, claims 5 and 20 depend upon claim 1 (Group I), and all of the distinctions of the invention over Group I are equally applicable to Group III.

Claim 5 contains the additional distinction that the substrate has a temperature between about 50 °C and about 150 °C when forming the pixel electrode. Claim 20 has the additional distinction that substrate temperature is half than the less than about 400 °C temperature.

At pages 3 and 4 of the Office Action of November 3, 2003, the Examiner turns to Tran (column 2, line 20 - Column 3, line 5; column 4, lines 24-44) for

teachings regarding temperature. Tran at column 2, lines 29-31 states: "A light transmissive, electrically conductive oxide precursor is sputtered onto a substance at a temperature from 20 °C. To 300 °C." Tran at column 4, lines 30-32 states: "Preferably, sputter depositing occurs at a temperature of from 25 °C. To 150 °C., and more preferably at 25 °C." That is, Tran gives an overall sputtering temperature and does not report the substrate temperature. Also, the preferred 25 °C temperature teaches away from the claimed temperatures of claims 5 and 20.

Also, the Examiner turns to Kaneko for teachings about ITO and IZO to reject the temperature limitations of claim 20. In using Kaneko in rejecting the preferred temperature embodiments, the Examiner counter-intuitively states: "Claims 20 and 21 are redundant. Because the claims 1 and 13 already have such limitations such as the substrate has a temperature of less than about 200 °C, and the 200 °C temperature is a half of the 400 °C temperature." (Office action of November 3, 2003 at page 6, lines 10-12.)

As a result, the invention as embodied in claims 5 and 20 of group III are patentable for these additional reasons as well. Thus, *prima facie* obviousness has not been shown over Group III.

Accordingly, reversal of the Examiner's rejection based on the above arguments is respectfully requested.

D. Group IV, Claims 19 and 21

The combination of the Appellants' disclosure with Tran and Suzuki fails to suggest all of the elements set forth in claim 19 to properly support the rejection of Group IV under 35 U.S.C. § 103. The combination of the Appellants' disclosure with Tran, Suzuki and Kaneko fails to suggest all of the elements set forth in claim 21 to properly support the rejection of Group IV under 35 U.S.C. § 103.

The failures of the combination of the Appellants' disclosure with Tran and Suzuki have been discussed above, and the general discussion thereof is incorporated here, but is not being repeated here so as to avoid repetition. Also, claims 19 and 21 depend upon claim 13 (Group II), and all of the distinctions of the invention over Group II are equally applicable to Group IV.

Claim 19 contains the additional distinction that the substrate has a temperature between about 50 °C and about 150 °C when forming the pixel electrode. Claim 21 has the additional distinction that substrate temperature is half said less than about 400 °C temperature.

At pages 3 and 4 of the Office Action of November 3, 2003, the Examiner turns to Tran (column 2, line 20 - Column 3, line 5; column 4, lines 24-44) for teachings regarding temperature. Tran at column 2, lines 29-31 states: "A light transmissive, electrically conductive oxide precursor is sputtered onto a substance at a temperature from 20 °C. To 300 °C." Tran at column 4, lines

30-32 states: "Preferably, sputter depositing occurs at a temperature of from 25 °C. To 150 °C., and more preferably at 25 °C." That is, Tran gives an overall sputtering temperature and does not report the substrate temperature. Also, the preferred 25 °C temperature teaches away from the claimed temperatures of claims 5 and 20.

Then, the Examiner turns to Kaneko for teachings about ITO and IZO to reject the temperature limitations of claim 20. In using Kaneko to reject the claimed preferred temperature embodiments, the Examiner counter-intuitively states: "Claims 20 and 21 are redundant. Because the claims 1 and 13 already have such limitations such as the substrate has a temperature of less than about 200 °C, and the 200 °C temperature is a half of the 400 °C temperature." (Office Action of November 3, 2003 at page 6, lines 10-12.)

As a result, the invention as embodied in claims 19 and 21 of Group IV are patentable for these additional reasons as well. Thus, *prima facie* obviousness has not been shown over Group IV.

Accordingly, reversal of the Examiner's rejection based on the above arguments is respectfully requested.

E. Group V, Claims 2, 3 and 14

The combination of the Appellants' disclosure with Tran, Suzuki and Kaneko fails to suggest all of the elements set forth in claims 2, 3 and 14 to properly support the rejection of Group V under 35 U.S.C. § 103.

The failings of the combination of the Appellants' disclosure with Tran and Suzuki (and further in view of Kaneko) have been discussed above, and the general discussion thereof is incorporated here, but is not being repeated here so as to avoid repetition. Also, claims 2 and 3 depend upon claim 1 (Group I) and claim 14 depends upon claim 13 (Group II) and all of the distinctions of the invention over Groups I and II are equally applicable to Group V.

Claims 2 and 14 pertain to the pixel electrode having an amorphous structure. Claim 3 pertains to the pixel electrode being etched with a weak acid etchant.

The Examiner turns to Kaneko and states at page 5, lines 19-21 of the Office Action of November 3, 2003: "Kaneko discloses (col. 5, lines 47-51) that the amorphous indium tin oxide (ITO) or indium zinc oxide (IZO) is preferably used as the material of the pixel electrodes, because the amorphous structure allows for use of a weak acid etchant . . ." However, the Examiner fails to point out how these teachings of Kaneko address the failures of the combination of the Appellants' disclosure with Tran and Suzuki to suggest the invention.

As a result, the invention as embodied in claims 2, 3 and 14 Group V are patentable for these additional reasons as well. Thus, *prima facie* obviousness has not been shown over Group V.

Accordingly, reversal of the Examiner's rejection based on the above arguments is respectfully requested.

F. Group VI, Claim 6

The combination of the Appellants' disclosure with Tran and Suzuki fails to suggest all of the elements set forth in claim 6 to properly support the rejection of Group VI under 35 U.S.C. § 103.

The failures of the combination of the Appellants' disclosure with Tran and Suzuki have been discussed above, and the general discussion thereof is incorporated here, but is not being repeated here so as to avoid repetition. Also, claim 6 depends upon claim 1 (Group I), and all of the distinctions of the invention over Group I are equally applicable to Group VI.

Claim 6 of Group VI sets forth the additional steps of forming a gate electrode over the substrate; entirely depositing a gate insulating film over the substrate to cover the gate electrode; and continuously depositing an active layer and an ohmic contact layer to overlap the gate electrode.

At the paragraph bridging pages 4 and 5 of the Office Action of November 3, 2003, the Examiner turns to the Appellants' own disclosure for teachings

pertaining to the content of claim 6 (and 15). However, the inability of the Appellants' disclosure to be utilized as prior art has been discussed in detail above.

As a result, the Appellants' disclosure cannot be combined with Tran and Suzuki to suggest the invention embodied in claim 6. Thus, *prima facie* obviousness has not been demonstrated over the Appellants' disclosure combined with Tran and Suzuki

Accordingly, reversal of the Examiner's rejection based on the above arguments is respectfully requested.

G. Group VII, Claims 7, 8 and 9

The combination of the Appellants' disclosure with Tran and Suzuki fails to suggest all of the elements set forth in claim 7, 8 and 9 to properly support the rejection of Group VII under 35 U.S.C. § 103.

The failures of the combination of the Appellants' disclosure with Tran and Suzuki have been discussed above, and the general discussion thereof is incorporated here, but is not being repeated here so as to avoid repetition. Also, claims 7, 8 and 9 depend upon claim 1 (Group I), and all of the distinctions of the invention over Group I are equally applicable to Group VII.

Claim 7 further recites that the protective layer is a passivation layer. Claim 8 further recites that the passivation layer is made from an inorganic

insulation material or an organic insulation material. Claim 9 further recites that the passivation layer is at least one material selected from the group consisting of silicon nitride, silicon oxide, an acrylic, polytetrafluoroethylene, benzocyclobutene, fluoropolymer resin and perfluorocyclobutane.

At the paragraph starting at page 5, line 3 of the Office Action of November 3, 2003, the Examiner turns to the Appellants own disclosure for teachings pertaining to the passivation layer. However, the inability of the Appellants disclosure to be utilized as prior art has been discussed in detail above.

As a result, the Appellants' disclosure cannot be combined with Tran and Suzuki to suggest the invention embodied in claims 7, 8 and 9. Thus, *prima facie* obviousness has not been demonstrated over the Appellants' disclosure combined with Tran and Suzuki

Accordingly, reversal of the Examiner's rejection based on the above arguments is respectfully requested.

H. Group VIII, Claims 10, 11 and 12

The combination of the Appellants' disclosure with Tran and Suzuki fails to suggest all of the elements set forth in claims 10, 11 and 12 to properly support the rejection of Group VIII under 35 U.S.C. § 103.

The failures of the combination of the Appellants' disclosure with Tran and Suzuki have been discussed above, and the general discussion thereof is incorporated here, but is not being repeated here so as to avoid repetition. Also, claims 10, 11 and 12 depend upon claim 1 (Group I), and all of the distinctions of the invention over Group I are equally applicable to Group VIII.

Claim 10 further recites that the pixel electrode comprises a transparent conductive material. Claim 11 further recites that the pixel electrode comprises at least one material selected from the group consisting of indium tin oxide, tin oxide and indium zinc oxide. Claim 12 further recites that the switching device has source and drain electrodes, and the source and drain electrodes comprise at least one material selected from the group consisting of Mo, Cr, Ti, Ta, MoW, MoTa and MoNb.

At the two paragraphs starting at page 5, line 8 of the Office Action of November 3, 2003, the Examiner turns to the Appellants' own disclosure for teachings pertaining to the electrodes. However, the inability of the Appellants' disclosure to be utilized as prior art has been discussed in detail above.

As a result, the Appellants' disclosure cannot be combined with Tran and Suzuki to suggest the invention embodied in claims 10, 11 and 12. Thus, *prima facie* obviousness has not been demonstrated over the Appellants' disclosure combined with Tran and Suzuki

Accordingly, reversal of the Examiner's rejection based on the above arguments is respectfully requested.

I. Group IX, Claim 15

The combination of the Appellants' disclosure with Tran and Suzuki fails to suggest all of the elements set forth in claim 15 to properly support the rejection of Group IX under 35 U.S.C. § 103.

The failures of the combination of the Appellants' disclosure with Tran and Suzuki have been discussed above, and the general discussion thereof is incorporated here, but is not being repeated here so as to avoid repetition. Also, claim 15 depends upon claim 13 (Group II), and all of the distinctions of the invention over Group II are equally applicable to Group IX.

Claim 13 of Group IX sets forth the additional features of a gate electrode over the substrate; a gate insulating film over the substrate covering the gate electrode; and an active layer and an ohmic contact layer overlapping the gate electrode.

At the paragraph bridging pages 4 and 5 of the Office Action of November 3, 2003, the Examiner turns to the Appellants' own disclosure for teachings pertaining to the content of claim 15. However, the inability of the Appellants' disclosure to be utilized as prior art has been discussed in detail above.

As a result, the Appellants' disclosure cannot be combined with Tran and Suzuki to suggest the invention embodied in claim 15. Thus, *prima facie* obviousness has not been demonstrated over the Appellants' disclosure combined with Tran and Suzuki

Accordingly, reversal of the Examiner's rejection based on the above arguments is respectfully requested.

J. Group X, Claim 16

The combination of the Appellants' disclosure with Tran and Suzuki fails to suggest all of the elements set forth in claim 16 to properly support the rejection of Group X under 35 U.S.C. § 103.

The failures of the combination of the Appellants' disclosure with Tran and Suzuki have been discussed above, and the general discussion thereof is incorporated here, but is not being repeated here so as to avoid repetition. Also, claim 16 depends upon claim 2 (Group II), and all of the distinctions of the invention over Group II are equally applicable to Group X.

Claim 16 further recites that the protective layer is an organic or inorganic passivation layer formed from at least one material selected from the group consisting of silicon nitride, silicon oxide, an acrylic, polytetrafluoroethylene, benzocyclobutene, fluoropolymer resin and perfluorocyclobutane.

At the paragraph starting at page 5, line 3 of the Office Action of November 3, 2003, the Examiner turns to the Appellants' own disclosure for teachings pertaining to the passivation layer. However, the inability of the Appellants' disclosure to be utilized as prior art has been discussed in detail above.

As a result, the Appellants' disclosure cannot be combined with Tran and Suzuki to suggest the invention embodied in claims 16. Thus, *prima facie* obviousness has not been demonstrated over the Appellants' disclosure combined with Tran and Suzuki

Accordingly, reversal of the Examiner's rejection based on the above arguments is respectfully requested.

K. Group XI, Claims 17 and 18

The combination of the Appellants' disclosure with Tran and Suzuki fails to suggest all of the elements set forth in claims 17 and 18 to properly support the rejection of Group VIII under 35 U.S.C. § 103.

The failures of the combination of the Appellants' disclosure with Tran and Suzuki have been discussed above, and the general discussion thereof is incorporated here, but is not being repeated here so as to avoid repetition. Also, claims 17 and 18 depend upon claim 2 (Group II), and all of the distinctions of the invention over Group II are equally applicable to Group XI.

Claim 17 further recites that the pixel electrode comprises a transparent conductive material selected from the group consisting of indium tin oxide, tin oxide and indium zinc oxide. Claim 18 further recites that the switching device has source and drain electrodes, and the source and drain electrodes comprise at least one material selected from the group consisting of Mo, Cr, Ti, Ta, MoW, MoTa and MoNb.

At the two paragraphs starting at page 5, line 8 of the Office Action of November 3, 2003, the Examiner turns to the Appellants' own disclosure for teachings pertaining to the electrodes. However, the inability of the Appellants' disclosure to be utilized as prior art has been discussed in detail above.

As a result, the Appellants' disclosure cannot be combined with Tran and Suzuki to suggest the invention embodied in claims 17 and 18. Thus, *prima facie* obviousness has not been demonstrated over the Appellants' disclosure combined with Tran and Suzuki

Accordingly, reversal of the Examiner's rejection based on the above arguments is respectfully requested.

L. Conclusion

The Appellants have demonstrated that the Examiner has failed to successfully allege that the rejected claims are *prima facie* obvious. It is clear that the pixel electrode and method of forming the same demonstrates novelty

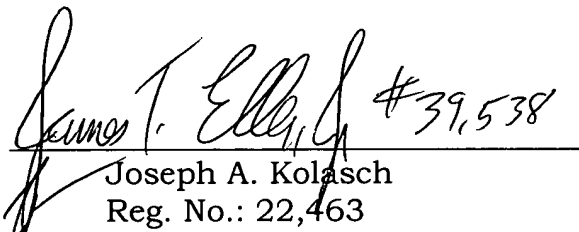
over the cited art. Also, utilizing the Appellants' disclosure as prior art (without an admission of prior art) is improper. For the reasons advanced above, it is respectfully submitted that all claims in this application are allowable. Thus, favorable reconsideration and reversal of the Examiner's rejection of claims 1-3 and 5-21 under 35 U.S.C. § 103, by the Honorable Board of Patent Appeals and Interferences, are respectfully solicited.

The required Appeal Brief fee in the amount of \$320.00 is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and further replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fee required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: APPENDIX A

APPENDIX A
CLAIMS ON APPEAL

1. (Previously Presented) A method of fabricating a pixel electrode in a liquid crystal display including a switching device for driving the pixel electrode, the method comprising:

depositing a protective film over a substrate to cover the switching device;

defining a contact hole in the protective film to expose one electrode of the switching device; and

forming the pixel electrode connected, via the contact hole, to said one exposed electrode, wherein the pixel electrode is formed by placing the substrate in a vacuum chamber and injecting hydrogen-containing gas at a temperature of less than about 400 °C, wherein the substrate has a temperature of less than about 200 °C when forming the pixel electrode.

2. (Original) The method as claimed in claim 1, wherein the pixel electrode has an amorphous structure.

3. (Original) The method as claimed in claim 1, wherein the pixel electrode is etched with a weak acid etchant.

4. (Canceled)

5. (Original) The method as claimed in claim 1, wherein the substrate has a temperature between about 50 °C and about 150 °C when forming the pixel electrode.

6. (Original) The method as claimed in claim 1, further comprising the steps of:

forming a gate electrode over the substrate;

entirely depositing a gate insulating film over the substrate to cover the gate electrode; and

continuously depositing an active layer and an ohmic contact layer to overlap the gate electrode.

7. (Original) The method as claimed in claim 1, wherein the protective layer is a passivation layer.

8. (Original) The method as claimed in claim 7, wherein the passivation layer is made from an inorganic insulation material or an organic insulation material.

9. (Original) The method as claimed in claim 7, wherein the passivation layer is at least one material selected from the group consisting of silicon nitride, silicon oxide, an acrylic, polytetrafluoroethylene, benzocyclobutene, fluoropolymer resin and perfluorocyclobutane.

10. (Original) The method as claimed in claim 1, wherein the pixel electrode comprises a transparent conductive material.

11. (Original) The method as claimed in claim 1, wherein the pixel electrode comprises at least one material selected from the group consisting of indium tin oxide, tin oxide and indium zinc oxide.

12. (Original) The method as claimed in claim 1, wherein the switching device has source and drain electrodes, and the source and drain electrodes comprise at least one material selected from the group consisting of Mo, Cr, Ti, Ta, MoW, MoTa and MoNb.

13. (Previously Presented) A pixel electrode in a liquid crystal display, which comprises:

a substrate;

a switching device over the substrate;

a protective film over a substrate covering the switching device; and
a contact hole in the protective film, the contact hole exposing one electrode of the switching device, the pixel electrode being connected, via the contact hole, to said one exposed electrode, wherein the pixel electrode is formed by placing the substrate in a vacuum chamber and injecting hydrogen-containing gas at a temperature of less than about 400 °C, wherein the substrate has a temperature of less than about 200 °C when forming the pixel electrode.

14. (Original) The pixel electrode as claimed in claim 13, wherein the pixel electrode has an amorphous structure.

15. (Original) The pixel electrode as claimed in claim 13, which further comprises:

a gate electrode over the substrate;
a gate insulating film over the substrate covering the gate electrode; and
an active layer and an ohmic contact layer overlapping the gate electrode.

16. (Original) The pixel electrode as claimed in claim 13, wherein the protective layer is an organic or inorganic passivation layer formed from at

least one material selected from the group consisting of silicon nitride, silicon oxide, an acrylic, polytetrafluoroethylene, benzocyclobutene, fluoropolymer resin and perfluorocyclobutane.

17. (Original) The pixel electrode as claimed in claim 13, wherein the pixel electrode comprises a transparent conductive material selected from the group consisting of indium tin oxide, tin oxide and indium zinc oxide.

18. (Original) The pixel electrode as claimed in claim 13, wherein the switching device has source and drain electrodes, and the source and drain electrodes comprise at least one material selected from the group consisting of Mo, Cr, Ti, Ta, MoW, MoTa and MoNb.

19. (Previously Presented) The pixel electrode as claimed in claim 13, wherein the substrate has a temperature between about 50 °C and about 150 °C when forming the pixel electrode.

20. (Previously Presented) The method as claimed in claim 1, wherein the substrate temperature is half said less than about 400 °C temperature.

21. (Previously Presented) The pixel electrode as claimed in claim 13, wherein the substrate temperature is half said less than about 400 °C temperature.